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# Levelling the Playing Field: A Genre Analysis of Online Search Language and Behaviour in UK Higher Education

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## ABSTRACT

This study examines the impact of non-native language speakers on their academic search queries, strategies and performance. Screen recordings and retrospective think aloud interviews were conducted with both native and non-native speakers. Based on a combined application of genre analysis and mapping of the participants' query formulations and interactions, this research derives 4 distinct strands to an established model of the information search process. Key differences in the searches are highlighted and the use of search genre for accommodating all university students are discussed.

## CCS CONCEPTS

•Information systems → information retrieval → users and interactive retrieval.

## KEYWORDS

online academic search; genre analysis; information search process; non-native English speakers; higher education.

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## 1 Introduction

At present, of the 2.2 million students currently in UK higher education, approximately 425,500 originate from countries where English is not the first language [14]. To enrol, universities require international students to 'function independently in a variety of academic and professional environments in English, although with a limited range of nuance and precision, and missing some subtleties and implied meanings' [7].

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Once enrolled, these learners join native English speaking peers in the classroom, defined in language as someone who can 'understand virtually everything heard or read with ease' [7]. To attain academic success, a key criterion is often the inclusion of 'deep, broad and wide-ranging secondary sources' [21], thus requiring students to search for sources beyond their reading lists. This poses the question of whether the different levels of English language from students on the same programme affects a student's ability to search for secondary sources online. To address this question, a comparative analysis of search queries and associated search behaviour aims to identify the linguistic control and choices of HE students in query formulation for interactive information searching. Analysis, focusing on the linguistic aspects of the online searches, identifies the differences (in this respect) between native and non-native English speaking students. Furthermore, the approach taken to model the cognitive processes and search behaviour in the interactions explores the possible impact of the linguistic choices in the query formulation, identifying four types of searchers and searches. The findings from this study are detailed in this paper and in presenting the identification of genres of search language this cross-disciplinary research aims to bridge 'the information science–linguistics relationship' [9].

## 2 Literature Review

This research stems from two academic disciplines: user-centred information retrieval and applied internet linguistics and is driven by the apparent similar intentions shared in the current literature. User centred information retrieval research aims to develop, adapt, and refine behavioural and cognitive search models and from this prominent models have emerged, including early frameworks on user information needs [29], those emphasising the contextual influences on information seeking behaviour [31], and user-system interaction [24]. With regard to applied linguistics, a field devoted to addressing language related problems or concerns, research intends to identify 'the recurrent uses of more-or-less conventionalized forms through which individuals...get things done using language' [5, 15]. The recognition of English as the de facto language in the digital world has led researchers to suggest a field of applied *internet* linguistics has emerged [8], focusing study on the use of language in online contexts such as in search in information retrieval interactions. According to Swales, a prominent linguist, genres are identified as recurrent choices of language closely related to the work of particular discourse

communities whose members share broad social purposes [28]. In recent years, the identification of online genres of language within emails, discussion forums, and social media have emerged [1, 23]. With regard to search language, however, research in applied linguistics remains ‘in its infancy’ [8].

With regards to the aim to identify differences in online searching amongst university students, previous research has identified differences in search behaviour between doctoral, postgraduate, and undergraduate students [6, 22], preferences for students to start their searches on non-academic search engines [11,16], and an absence of advanced search strategies, such as Boolean [6]. With regard to non-native English speakers, library-specific lexis has been viewed as overwhelming [25], requests for help may be avoided due to the language barrier [20], and students from different cultural backgrounds ‘have significant differences in terms of opinions about and use of resources’ [13]. Further individual differences affecting the linguistic and behavioural aspects to searching include cognitive styles [10, 17] and domain expertise on the nature of queries [30]. Focusing on the queries formulated by users with cognitive impairment of dyslexia, it was identified that a greater number of and shorter queries were submitted by the study group [2], whilst patterns of language queries were also identified in situations wherein a person may otherwise be unwilling to reveal the information need elsewhere or to others [12].

Beyond the study of individual differences and the effect on query and its formulation, research has focused on behavioural differences in search. In 1988, Kuhlthau [18] devised the highly-cited model of the Information Search Process (ISP). Her study focused on ‘twenty-six academically capable students [with] advanced English’, who searched in a library for relevant academic sources. This pre-digital research identified six stages of search and recognised affective, cognitive, and physical actions as three interrelated factors. Attempts to map Kuhlthau’s ISP in different settings facilitate exploration of the contextual impacts (typically goals and task) on the ISP. Shah, et al. [26], for example, based the analysis of collaborative information seeking on differences according to Kuhlthau’s model. In the study [26], differences in collaborative information seeking, when compared to the individual’s model of the ISP, were identified specifically in the cognitive and affective associated with the part of the process involving the information searcher making relevance judgements. Interestingly, the findings from studies that have likewise focused on behavioural analysis of non-native language speakers information retrieval have suggested the need for subject-specific lexis [30], the importance of online reading abilities [4, 19], and the preference for ‘their own language for retrieval’ [27]. The findings of these studies, as such, appear to suggest that to enable search, focus must be placed on the language used in the activities involved in accomplishing the search process. This study aims to align the (analysis of the) linguistic choice and form in the information search process amongst native and non-native English speaking university students. Specifically our research objective seeks to identify differences in the linguistic aspects to the queries, and through the analysis of shared cognitive and behavioural

aspects of the search process, explore and stage the genre-specific features in the ‘language of search’.

### 3 Method

Data were collected from a cohort of foundation year Business Management undergraduate students at Manchester Metropolitan University. To gather data, the researchers selected twenty participants who volunteered to conduct an academic online search task. This required them to search and record three sources for their university assignment, ‘*Snapchat is an effective tool for marketing and advertising in the UK. To what extent do you agree or disagree?*’ Quantitative data were collected on the participants’ search language via screen-recording software. Language was coded for form (structural-linguistic accuracy) and meaning (lexical-semantic analysis). Screen recordings also provided quantitative data on search behaviour, including search engine selection, length of time on results pages, and number of sites visited. Following the task, participants were invited to cued retrospective think-aloud interviews to comment on their search language, behaviour, and feelings. This method provided qualitative data on participants’ cognitive processes during the search and, in contrast to concurrent think-aloud, allowed participants to critically reflect and articulate search strategies. Search performance was evaluated and rated 0-15 via the CRAAP test [3], banded as 0-3: *very questionable source, do not cite*, 4-7: *adequate for information, but do not cite*, 8-11: *good source to use and cite*, 12-15: *excellent source*. The key variable within the data was the participants’ first language: ten of the selected participants were native speakers, and ten were non-native English speakers.

### 4 Findings

The aim in the analysis undertaken was to identify patterns in participants’ searches that may not otherwise be immediately obvious. The data collected share similarities to Kuhlthau’s affective and cognitive factors and stages of search. Analysis of the screencasts, triangulated with the interviews and search performance, further suggested participants’ exhibited patterns in both language and online interaction; two factors added to Kuhlthau’s Information Search Process (figure 1). For the purpose of identifying the following four strands of this revised model or genres of search, we focus analysis of the linguistic and online interactions, assisted by their alignment to the stages and cognitive and affective. Modeling of the data from the twenty participants in this way creates the proposed genres of the language of search.

#### 4.1 A prescribed-genre and cross genre model

Of the twenty participants, two students exclusively used academic search engines: Science Direct, and Google Scholar. Their search terms contained relevant key words taken from the task [snapchat, marketing, UK] and relevant language from outside the task [social media]: the superordinate of snapchat.

Search performance was scored 13 (excellent sources), considerably higher than the participant average of 5.

	Initiation	Selection	Exploration	Formulation	Collection	Presentation/Assessment
<b>Feelings (affective)</b>	Uncertain	Optimism	Confusion Frustration Doubt	Clarity	Sense of direction/ confidence	Satisfaction or sense of disappointment / accomplishment
<b>Thoughts (cognitive)</b>	vague → focused → increased interest → Increased self-awareness					Increased self-awareness
<b>Interaction (online)</b>	Search engine selection	Search Engine Results Page (SERP) analysis	Search Engine Interaction			Source Evaluation
<b>Online Search Language</b>	Topic and keyword identification (pre-writing)		Search term formulation (writing)			Selection of sources (post-writing)

Figure 1: Kuhlthau's ISP revised with interactions & search language

uncertainty	Clarity		Disappointment/ accomplishment
vague	focused → increased interest → Increased self-awareness		Increased self-awareness
Exclusive use of academic search engines	Critical evaluation of SERPs	Competent navigation of academic search engines. Critical reading of results and sources. Awareness of advanced online search tools.	Application of evaluation tool
Essential key words extracted from task. Awareness of key word reformulation	Key word search and reformulation of key word language (e.g. superordinates) based on results.		Accurate recording of sources

Figure 2: Prescribed search language and interactions

During interviews, the library workshop was referred to as a rationale for the use of the academic sites, and both were able to identify their use of the CRAAP evaluation tool when reading and selecting sources, for instance, noting the importance of publication date. One of the participants shifted from specific language [snapchat] to the umbrella term [social media] to "broaden my results". The selection of relevant key words, the awareness and use of language from outside the task, the critical evaluation of sources on academic sites, and the high level of task-achievement suggests these participants followed a prescribed-genre model to online academic searching. A model (figure 2) this paper suggests is a best practice for online academic search tasks. Both participants were native English speakers. Seven participants used the closed interrogative of the task to search, for example [is snapchat an effective tool for marketing and advertising in the UK?]. This accounted for 31% of the searches amongst this group, with three of the seven exclusively using the question form, and four using a combination of interrogatives and search terms. Within the terms, all of the language taken from outside of the task was coded as relevant: [marketing campaign, endorser, pros and cons, disadvantages]. This assortment of search language and form reflected the choice of search engines, with all starting their search on Google, three remaining on the site, and four shifting to the online library and Google Scholar.

uncertainty	Clarity		Disappointment/ accomplishment
vague	focused → increased interest → Increased self-awareness		Increased self-awareness
Academic and non-search engines	Limited evaluation of SERPs	Competent navigation of search engines. Shifts from non-academic to academic sites, and vice versa	Limited use of evaluation tool
Most key words extracted from the task Awareness of key word reformulation	Interrogative forms and key word searches. Limited use of reformulated key word language		Limited recording of sources

Figure 3: Mixed prescribed/everyday language and interactions

Search performance averaged 7: (adequate for information, but do not cite). Whilst the cognitive processes are not detailed here, the data analysed reveals that these participants progressed the search with increasing focus (as in the prescribed model) however in taking a mixed approach in search behaviour and query this group seemingly drew on their broader practices of everyday web searching. A linguistic preference to ask search engines questions was identified even when it was recognized that this failed to produce sufficient results in the context of the academic search task. Defined as recurrent choices of language having a shared set of communicative purposes [15, 28], this suggests a genre of online search language exists amongst these participants. With a mixture of academic and non-academic search engines, shifts from interrogatives to key words and vice versa, limited use of reformulated key words, and less time spent on the analysis of results pages, these participants possessed elements of the prescribed-genre, but were limited in language choice and in evaluation of the results. The cross-genre model (figure 3) defines patterns of language and behaviour from prescribed and everyday practices. These participants were all native English speakers.

## 4.2 A language-deficient and genre deficient model

The remaining two models refer to the 11 participants whose lexical range, accuracy, and awareness contributed to low performance in the task. Within this group, eight followed a language-deficient model (figure 4). Data identified these participants were unable to identify key words in the task and the production of non-relevant and/or inaccurate language in their search terms, such as [snapchat news, points of good marketing, how snapchat response to online marketing]. These participants shared behavioural features of the cross-genre model, with the group using both academic and non-academic sites, and attaining an average search performance of 5: adequate for information, but do not cite. However, language difficulties when reading suggests that students' evaluation of the SERP and/or of the selected sources was limited. One of the participants was a native English speaker; the remaining seven were non-native speakers.

uncertainty		Clarity	disappointment/ accomplishment
vague		Focused	Increased self-awareness
		increased interest	
Academic and non search engines	Limited evaluation of SERPs	Competent navigation of search engines. Shifts from non-academic to academic sites, and vice versa.	Limited use of evaluation tool
Incorrect (or limited) key words extracted from the task. Limited ability to reformulate key words		Use of non-relevant language in search. Language difficulties reading results and sources	Limited recording of sources

Figure 4: **Deficient search language model**

Three of the participants exhibited difficulties in both language and search strategy. These are modelled as following a language and genre-deficient model (figure 5). With regard to search, these participants exclusively used the non-academic search engines of Google and Yahoo. One student selected the ‘ads’ on the results page, and another selected image results rather than texts. On average, these students spent less time than peers on sites with potential sources.

uncertainty			
vague			
Exclusive use of non-academic search engines	Limited evaluation of SERPs	Difficulties in search engine interaction.	No use of evaluation tool
Incorrect (or limited) key words extracted from the task. Limited ability to reformulate key words		Use of non-relevant language in search. Language difficulties reading results and sources	Limited recording of sources

Figure 5: **A language and interaction deficient search**

One participant’s interview explained this brevity; “I wasn’t sure what I was looking for”. In terms of language, the participants shared similarities to the language-deficient model. All language used in search terms taken from outside of the task was coded as irrelevant and/or orthographically incorrect, for example: [snapchat sources, snapchat stories, using snapchat in the uk]. These difficulties led to an average search performance score of 3: very questionable source, do not cite. Interviews supported the screencasts’ implication that these participants did not assess their recorded sources. The cognitive and affective aspects are not modelled although it was apparent that focus and clarity were not attained. All three participants were non-native English speakers.

### 4.3 Native vs non-native English speaker

This research has identified four models of search amongst university students. The range of performance has identified, at one end, a prescribed-genre model. In this model people are able to adapt their search language and behaviour to interact effectively with academic search engines. Conversely, a language and genre deficient model of search aligns with learners with limited linguistic control and search strategies. A noticeable finding within these models is the division of participants based on their first language, with nine of the ten native English speakers following a prescribed-genre (n. 2) and cross-genre model (n. 7),

whilst all of the ten non-native English speakers adopted language (n. 7) or language and genre (n. 3) deficient models. Within these models, three additional differences were found. The first relates to lexical semantics and the search terms used. The non-native speakers were less proficient in their knowledge, and less efficient in the production of language outside of the search task than their peers. Of the 44 words taken outside of the essay title, the 12 words coded as beneficial to the search task were exclusively input by the native speaking participants, with the remaining 32, coded as non-beneficial, produced by the non-native speaking students. The second difference is the use of closed interrogatives. This search strategy was only used by the native speaking participants. Conversely, all of the non-native speakers’ search terms were in statement form. The third difference focuses on search engine. Use was broadly similar amongst the two groups, with a combination of academic and non-academic. The difference, however, was the order within the cross-genre and language deficient models. Data shows a general shift from academic to non-academic sites amongst the non-native speakers, and vice versa for the native speakers.

## 5 Discussion and Conclusion

This study illustrates the importance of a user’s linguistic ability in the search process, and through the application of genre analysis, identifies the patterns of prescribed genre and cross-genre online search languages. Within the former, searchers identify key lexis in search tasks, reformulate this language using linguistic tools such as synonymy, hyponymy, and superordinates, and fluently interact with search engines. Regarding the latter, we identify searchers who adopt the linguistic pattern of asking closed questions. A practice seemingly transferred from their everyday use of search engines to an academic search task. Our modelling of native and non-native English speaking university students when searching online suggests an uneven playing field. For the native English speakers, communication with search engines was conducted in either a prescribed or cross (i.e. interrogatives) genre. For non-native English speakers, searches were conducted in one of the deficient genres, with weaker performance. The identification of the genres of search and competences points to further research. Our research identifies the cross genre with the use of questions and, notably the absence of these interrogative forms in the language deficient search genres. This practice appears to be adopted out of Google’s accommodation of interrogative forms. In this study approximately 40% of the participants who used question forms clicked on the paraphrased questions from Google’s responding ‘people also ask’. Was there a breakdown in communication for the native speaking participants who used questions but which were not recognized on the academic search engines? A question for universities therefore may be whether accommodation of interrogative forms, combined with the training of this practice to non-native speakers, would be more effective than the current training of students on a prescribed genre of academic search: a model seemingly ignored by some students and overly-challenging for their non-native peers.

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